Using AXYZ Machines

Drag Knives

Contents

Introduction

This manual is meant to be used in conjunction with the A2MC Configuration Utility manual and the A2MC User Guide. These two manuals are general reference manuals for the A2MC on all machine configurations while this manual provides specific information specifically on drag knives and how to use them.

There are two types of drag knives available for use on AXYZ machines:

This is a light duty very accurate drag knife system that fastens as a separate device on to the Z axis of the machine. This device fits vinyl cutting heads typical of a roll feed vinyl cutters. It can also fit "Sharpie" type pens for drawing.

This drag knife is used for cutting pre-applied vinyl. It features a precise pressure adjustment and depth control from the blade to avoid scoring the substrate.

This drag knife system fits onto a normal spindle collet and can be inserted into a spindle. This system can switch between routing and knife cutting in seconds.

The "Exacto" style blades are cheap and easy to use. The spring tension can be adjusted and blades changed easily.

This system is recommended for occasional standard quality knife cutting. It is very suitable for larger pre-applied vinyl processing as well as a variety of utility knife projects.

General User Guide

Setting up the Tool Map Properties

Drag knives are set up using the tool map in the A2MC Configuration Utility (also referred to as the Setup GUI). The tool properties or parameters of drag knives are:

➢ Installed on a Z axis therefore have a tool height value.
➢ RPM is set to zero.
➢ They require a "drag knife" offset or compensation to account for the tip of the knife trailing the centerline of the swivel.
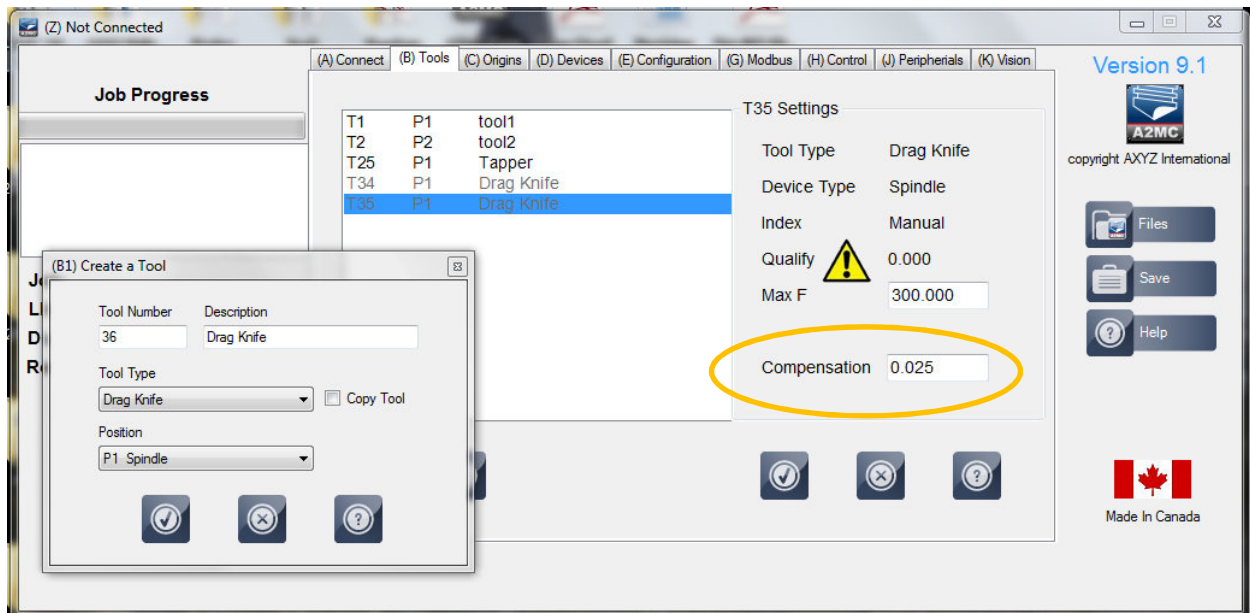

This example is using the Collet style drag knife. The light duty drag knife is similar except that it is set up as "drag knife" in the devices tab as well.

Note that there is no option to set an RPM value and the knife offset compensation is shown circles in orange.

Drag Knife Compensation

The tip of the drag knife trails the swivel of the knife itself:

Drag knife swivel

Drag knife offset
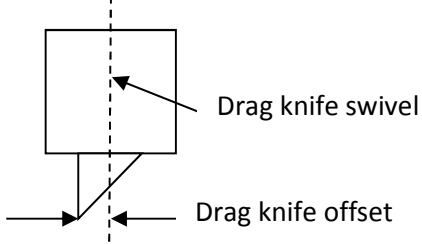
In order that the drag knife cuts in line with the direction of the cut the tool itself incorporates a swivel with the tip of the knife positioned behind the swivel. The difference between the centerline of the swivel and the tip of the knife is the drag knife offset. Depending on the size of the knife this distance can be between 0.5 mm (0.02 inches) for very small knives for cutting fragile material and 6 mm (0.25 inches) for much heavier knifes.
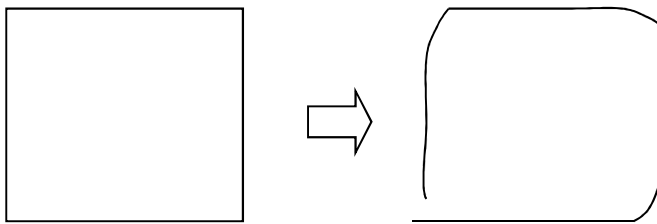
Without compensating for the drag knife offset the drag knife will tend to round off the corners of a cut as shown in the diagram. Also the start and end points of a cut will be incomplete.

With a compensation value equal to the drag knife offset the A2MC will automatically adjust the cutting path to produce the desired output:
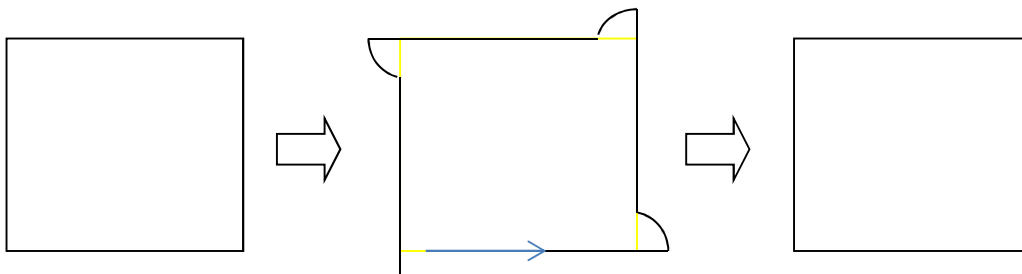
The left diagram is the desired cut path described by the NC file. The A2MC will use the drag knife compensation to create the path shown in the center diagram. The actual cut output is shown on the right.

Tool Heights

Although drag knives are two dimensional devices they still need to know where the surface of the table is so tool heights are required. For drag knife devices use function 25 to set the tool height. See the User Guide for a description on how to use this function.

Changing Tools

Since there are number of different knives that can be used each with varying lengths and knife offsets they can be changed manually just like a collet spindle provided that:

1. Each drag knife used is assigned a tool number.
2. The drag knife has a tool height and knife compensation programmed as described above.

Drag Knife Types

There are two different drag knife types or styles available. Each is set up slightly differently.

Collet Drag Knife

This type of knife fits into a regular collet and therefore into a spindle. This is a very convenient knife that can be fitted onto any machine that has a spindle. Since the knife fits into a spindle there is no specific device for the drag knife, it is simply a tool that fits into the spindle device.

The A2MC controller identifies the tool as a drag if provided that:

1. The spindle RPM is set to zero.
2. The tool compensation is greater than zero.

If both conditions are true then the A2MC will correctly apply the drag knife compensation.

NOTE: if the spindle RPM is set to zero then the spindle will not turn even if the nc code commands the spindle to turn or sets a spindle speed. It is therefore not necessary to have a special post for the drag knife.

Heavy Duty Drag Knife

This drag knife is set up as a separate device on its own Z axis using the device tab in the A2MC Configuration utility:
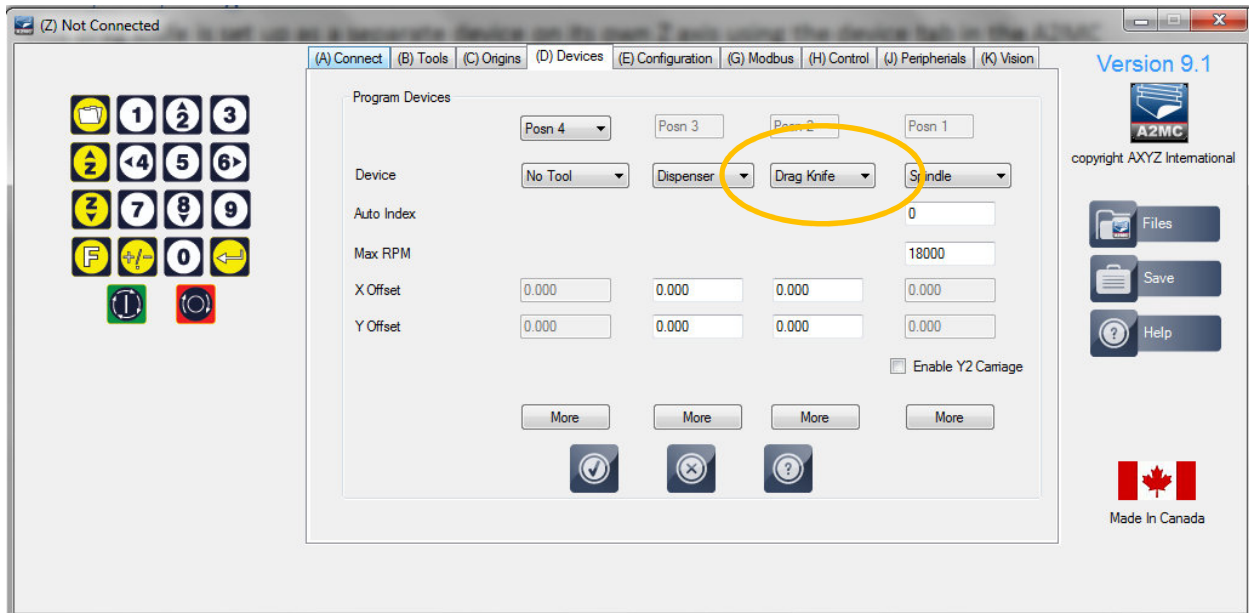
Once the drag knife device is set up any number of tools can be assigned as required to accommodate the different knife lengths and offsets.